CLAIMS

What is claimed is:

1. A method for creating a keyword string database, the method comprising:

   determining one or more candidate keyword strings to store in said database;

   creating one or more bit vectors based at least in part on said one or more candidate keyword strings, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

   storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

2. The method of claim 1 wherein said bit vector further comprises at least one bit that represents a non-alphanumeric symbol.

3. The method of claim 2 wherein said non-alphanumeric symbol indicates an email address.

4. The method of claim 2 wherein said non-alphanumeric symbol indicates a mobile number.

5. The method of claim 2 wherein said non-alphanumeric symbol indicates a wired number.

6. The method of claim 2 wherein said non-alphanumeric symbol indicates a paper-mail address.

7. The method of claim 2 wherein said non-alphanumeric symbol indicates a cost ranking.

8. The method of claim 2 wherein said non-alphanumeric symbol indicates a quality ranking.

9. The method of claim 2 wherein said non-alphanumeric symbol indicates a cuisine.

10. A method for incremental keyword search, the method comprising:

    submitting an input keyword string comprising one or more words comprising one or more symbols; and

    receiving in response to said submitting at least one candidate keyword string having a bit vector that matches a bit vector of said input keyword string.

11. The method of claim 10, further comprising preempting said method after a predetermined amount of time.

12. The method of claim 11 wherein said predetermined amount of time is two seconds.

13. A method for incremental keyword search, the method comprising:

    receiving an input keyword string comprising one or more words comprising one or more symbols;

    creating a bit vector based at least in part on said input keyword string;

comparing said bit vector with one or more other bit vectors representing at least one

candidate keyword string to create a set of matching bit vectors;

applying a conventional keyword matching algorithm to said at least one candidate keyword

string represented by said set of matching bit vectors; and

presenting any matching candidate keyword strings.

14. The method of claim 13, further comprising preempting said method after a predetermined

amount of time.

15. The method of claim 14 wherein said predetermined amount of time is two seconds.

16. The method of claim 13 wherein said comparing is independent of the order of keyword

prefixes in keyword strings.

17. A method for creating a keyword string database, the method comprising:

determining one or more candidate keyword strings to store in said database;

creating one or more bit vectors based at least in part on said one or more candidate keyword

strings, said bit vector having a bit position for each symbol in an alphabet and having

bits set for bit positions corresponding to at least one symbol representing the first

symbol of a word in said one or more candidate keyword strings, said one or more bit

vectors for use in comparing an input bit vector with said one or more bit vectors to

indicate whether an input keyword string represented by said input bit vector matches

said one or more candidate keyword strings; and

storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

18. A method for incremental keyword search, the method comprising:

submitting an input keyword string comprising one or more words comprising one or more symbols; and

receiving in response to said submitting at least one candidate keyword string where the first symbol of at least one word in each of said at least one candidate keyword string matches the first symbol of the corresponding word in said input keyword string.

19. The method of claim 18, further comprising preempting said method after a predetermined amount of time.

20. The method of claim 19 wherein said predetermined amount of time is two seconds.

21. A method for incremental keyword search, the method comprising:

receiving an input keyword string comprising one or more words comprising one or more symbols;

creating a bit vector based at least in part on said input keyword string, said bit vector having a bit position for each symbol in an alphabet and having bits set for positions corresponding to at least one symbol representing the first symbol of a word in said input keyword string;

comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors;

applying a conventional keyword matching algorithm to said at least one candidate keyword

string represented by said set of matching bit vectors; and

presenting any matching candidate keyword strings.

22. The method of claim 21, further comprising preempting said method after a predetermined

amount of time.

23. The method of claim 22 wherein said predetermined amount of time is two seconds.

24. The method of claim 21 wherein said comparing is independent of the order of keyword

prefixes in keyword strings.

25. A method for comparing keyword strings, the method comprising:

determining a relative frequency of use for at least one symbol in a language;

assigning a statistical weighting to said at least one symbol based at least in part on a relative

frequency of use of said at least one symbol;

assigning each of said at least one symbol to one of a plurality of groups; and

comparing a first keyword string and a second keyword string based at least in part on

whether at least one symbol of said first keyword string is assigned to the same group as

at least one corresponding symbol of said second keyword string.

26. The method of claim 25 wherein said assigning further comprises assigning each of said at least one symbol to one of a plurality of groups so as to minimize the difference between the sums of statistical weightings for symbols comprising each group in said plurality of groups.

27. The method of claim 25 wherein said relative frequency of use comprises the relative frequency of use of symbols in the first character of words in said language.

28. A method for creating a keyword string database, the method comprising:

determining one or more candidate keyword strings to store in said database;

creating one or more bit vectors based at least in part on said one or more candidate keyword strings, each bit of said one or more bit vectors corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to the first symbol of a word in said one or more candidate keyword strings being set, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

29. A method for incremental keyword search, the method comprising:

submitting an input keyword string comprising one or more words comprising one or more symbols, each symbol representing the first symbol of a word in a search string; and

receiving in response to said submitting at least one candidate keyword string where the first

symbol of each word in each candidate keyword string is comprised by a group

comprising said one or more symbols.

30. The method of claim 29, further comprising preempting said method after a predetermined

amount of time.

31. The method of claim 30 wherein said predetermined amount of time is two seconds.

32. A method for incremental keyword search, the method comprising:

receiving an input keyword string comprising one or more words comprising one or more

symbols, each symbol representing the first symbol of a word in a search string;

creating a bit vector based at least in part on said input keyword string, each bit

corresponding to one or more symbols in an alphabet, bits having a bit position

corresponding to said one or more symbols being set;

comparing said bit vector with one or more other bit vectors representing at least one

candidate keyword string to create a set of matching bit vectors;

applying a conventional keyword matching algorithm to said at least one candidate keyword

string represented by said set of matching bit vectors; and

presenting any matching candidate keyword strings.

33. The method of claim 32, further comprising preempting said method after a predetermined

amount of time.

34. The method of claim 33 wherein said predetermined amount of time is two seconds.

35. The method of claim 32 wherein said comparing is independent of the order of keyword prefixes in keyword strings.

36. A method for creating a keyword string database, the method comprising:

determining one or more candidate keyword strings to store in said database;

creating one or more bit vectors based at least in part on said one or more candidate keyword strings, each bit of said one or bit vector corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to a symbol of a prefix of a word in said one or more candidate keyword strings being set, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

37. A method for incremental keyword search, the method comprising:

submitting an input keyword string comprising one or more words comprising one or more symbols; and

receiving in response to said submitting at least one candidate keyword string where a prefix of a word of a matching candidate keyword string comprises at least one symbol that

belongs to the same symbol group as the corresponding symbol of the corresponding word in said input keyword string.

38. The method of claim 37, further comprising preempting said method after a predetermined amount of time.

39. The method of claim 38 wherein said predetermined amount of time is two seconds.

40. A method for incremental keyword search, the method comprising:

receiving an input keyword string comprising one or more words comprising one or more symbols;

creating a bit vector based at least in part on said input keyword string, each bit corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to a prefix of a word in said one or more symbols being set;

comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors;

applying a conventional keyword matching algorithm to said at least one candidate keyword string represented by said set of matching bit vectors; and

presenting any matching candidate keyword strings.

41. The method of claim 40, further comprising preempting said method after a predetermined amount of time.

42. The method of claim 41 wherein said predetermined amount of time is two seconds.

43. The method of claim 40 wherein said comparing is independent of the order of keyword prefixes in keyword strings.

44. A method for incremental keyword search, the method comprising:

receiving an input keyword string comprising one or more words comprising one or more symbols, each symbol representing the first symbol of a word in a search string;

receiving a hierarchy, elements of said hierarchy comprising intermediate nodes and leaf nodes representing one or more keyword strings comprising one or more words comprising one or more symbols;

creating hierarchy bit vectors corresponding to said one or more keyword strings in said hierarchy;

searching said hierarchy bit vectors for a match with said input keyword string, said searching comprising, for each of said elements of said hierarchy:

saving said input keyword string;

applying a logical "AND" operation to the bit vector of the element and a bit vector based at least in part on said input keyword string, said applying producing a result;

if said result is nonzero, removing from said input keyword string any words in said input keyword string that are prefixes of words in the element;

if said input keyword string is empty, adding said element to a list of matched items; and

restoring said input keyword string; and

rendering said list of matched items.

45. A method for creating a keyword string database, the method comprising:

    step for determining one or more candidate keyword strings to store in said database;

    step for creating one or more bit vectors based at least in part on said one or more candidate keyword strings, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

    step for storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

46. The method of claim 45 wherein said bit vector further comprises at least one bit that represents a non-alphanumeric symbol.

47. The method of claim 46 wherein said non-alphanumeric symbol indicates an email address.

48. The method of claim 46 wherein said non-alphanumeric symbol indicates a mobile number.

49. The method of claim 46 wherein said non-alphanumeric symbol indicates a wired number.

50. The method of claim 46 wherein said non-alphanumeric symbol indicates a paper-mail address.

51. The method of claim 46 wherein said non-alphanumeric symbol indicates a cost ranking.

52. The method of claim 46 wherein said non-alphanumeric symbol indicates a quality ranking.

53. The method of claim 46 wherein said non-alphanumeric symbol indicates a cuisine.

54. A method for incremental keyword search, the method comprising:

   step for submitting an input keyword string comprising one or more words comprising one or more symbols; and

   step for receiving in response to said submitting at least one candidate keyword string having a bit vector that matches a bit vector of said input keyword string.

55. The method of claim 54, further comprising step for preempting said method after a predetermined amount of time.

56. The method of claim 55 wherein said predetermined amount of time is two seconds.

57. A method for incremental keyword search, the method comprising:

   step for receiving an input keyword string comprising one or more words comprising one or more symbols;

   step for creating a bit vector based at least in part on said input keyword string;

   step for comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors;

step for applying a conventional keyword matching algorithm to said at least one candidate keyword string represented by said set of matching bit vectors; and

step for presenting any matching candidate keyword strings.

58. The method of claim 57, further comprising step for preempting said method after a predetermined amount of time.

59. The method of claim 58 wherein said predetermined amount of time is two seconds.

60. The method of claim 57 wherein said comparing is independent of the order of keyword prefixes in keyword strings.

61. A method for creating a keyword string database, the method comprising:

step for determining one or more candidate keyword strings to store in said database;

step for creating one or more bit vectors based at least in part on said one or more candidate keyword strings, said bit vector having a bit position for each symbol in an alphabet and having bits set for bit positions corresponding to at least one symbol representing the first symbol of a word in said one or more candidate keyword strings, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

step for storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

62. A method for incremental keyword search, the method comprising:

    step for submitting an input keyword string comprising one or more words comprising one or more symbols; and

    step for receiving in response to said submitting at least one candidate keyword string where the first symbol of at least one word in each of said at least one candidate keyword string matches the first symbol of the corresponding word in said input keyword string.

63. The method of claim 62, further comprising step for preempting said method after a predetermined amount of time.

64. The method of claim 63 wherein said predetermined amount of time is two seconds.

65. A method for incremental keyword search, the method comprising:

    step for receiving an input keyword string comprising one or more words comprising one or more symbols;

    step for creating a bit vector based at least in part on said input keyword string, said bit vector having a bit position for each symbol in an alphabet and having bits set for positions corresponding to at least one symbol representing the first symbol of a word in said input keyword string;

    step for comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors;

    step for applying a conventional keyword matching algorithm to said at least one candidate keyword string represented by said set of matching bit vectors; and

    step for presenting any matching candidate keyword strings.

66. The method of claim 65, further comprising step for preempting said method after a predetermined amount of time.

67. The method of claim 66 wherein said predetermined amount of time is two seconds.

68. The method of claim 65 wherein said comparing is independent of the order of keyword prefixes in keyword strings.

69. A method for comparing keyword strings, the method comprising:

step for determining a relative frequency of use for at least one symbol in a language;

step for assigning a statistical weighting to said at least one symbol based at least in part on a relative frequency of use of said at least one symbol;

step for assigning each of said at least one symbol to one of a plurality of groups; and

step for comparing a first keyword string and a second keyword string based at least in part on whether at least one symbol of said first keyword string is assigned to the same group as at least one corresponding symbol of said second keyword string.

70. The method of claim 69 wherein said step for assigning further comprises step for assigning each of said at least one symbol to one of a plurality of groups so as to minimize the difference between the sums of statistical weightings for symbols comprising each group in said plurality of groups.

71. The method of claim 69 wherein said relative frequency of use comprises the relative frequency of use of symbols in the first character of words in said language.

72. A method for creating a keyword string database, the method comprising:

step for determining one or more candidate keyword strings to store in said database;

step for creating one or more bit vectors based at least in part on said one or more candidate keyword strings, each bit of said one or more bit vectors corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to the first symbol of a word in said one or more candidate keyword strings being set, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

step for storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

73. A method for incremental keyword search, the method comprising:

step for submitting an input keyword string comprising one or more words comprising one or more symbols, each symbol representing the first symbol of a word in a search string; and

step for receiving in response to said submitting at least one candidate keyword string where the first symbol of each word in each candidate keyword string is comprised by a group comprising said one or more symbols.

74. The method of claim 73, further comprising step for preempting said method after a predetermined amount of time.

75. The method of claim 74 wherein said predetermined amount of time is two seconds.

76. A method for incremental keyword search, the method comprising:

step for receiving an input keyword string comprising one or more words comprising one or more symbols, each symbol representing the first symbol of a word in a search string;

step for creating a bit vector based at least in part on said input keyword string, each bit corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to said one or more symbols being set;

step for comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors;

step for applying a conventional keyword matching algorithm to said at least one candidate keyword string represented by said set of matching bit vectors; and

step for presenting any matching candidate keyword strings.

77. The method of claim 76, further comprising step for preempting said method after a predetermined amount of time.

78. The method of claim 77 wherein said predetermined amount of time is two seconds.

79. The method of claim 76 wherein said comparing is independent of the order of keyword prefixes in keyword strings.

80. A method for creating a keyword string database, the method comprising:

   step for determining one or more candidate keyword strings to store in said database;

   step for creating one or more bit vectors based at least in part on said one or more candidate keyword strings, each bit of said one or bit vector corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to a symbol of a prefix of a word in said one or more candidate keyword strings being set, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

   step for storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

81. A method for incremental keyword search, the method comprising:

   step for submitting an input keyword string comprising one or more words comprising one or more symbols; and

   step for receiving in response to said submitting at least one candidate keyword string where a prefix of a word of a matching candidate keyword string comprises at least one symbol that belongs to the same symbol group as the corresponding symbol of the corresponding word in said input keyword string.

82. The method of claim 81, further comprising step for preempting said method after a predetermined amount of time.

83. The method of claim 82 wherein said predetermined amount of time is two seconds.

84. A method for incremental keyword search, the method comprising:

    step for receiving an input keyword string comprising one or more words comprising one or more symbols;

    step for creating a bit vector based at least in part on said input keyword string, each bit corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to a prefix of a word in said one or more symbols being set;

    step for comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors;

    step for applying a conventional keyword matching algorithm to said at least one candidate keyword string represented by said set of matching bit vectors; and

    step for presenting any matching candidate keyword strings.

85. The method of claim 84, further comprising step for preempting said method after a predetermined amount of time.

86. The method of claim 85 wherein said predetermined amount of time is two seconds.

87. The method of claim 84 wherein said comparing is independent of the order of keyword prefixes in keyword strings.

88. A method for incremental keyword search, the method comprising:

  step for receiving an input keyword string comprising one or more words comprising one or

  more symbols, each symbol representing the first symbol of a word in a search string;

  step for receiving a hierarchy, elements of said hierarchy comprising intermediate nodes and

  leaf nodes representing one or more keyword strings comprising one or more words

  comprising one or more symbols;

  step for creating hierarchy bit vectors corresponding to said one or more keyword strings in

  said hierarchy;

  step for searching said hierarchy bit vectors for a match with said input keyword string, said

  step for searching comprising, for each of said elements of said hierarchy:

   step for saving said input keyword string;

   step for applying a logical "AND" operation to the bit vector of the element and a bit

   vector based at least in part on said input keyword string, said applying producing a

   result;

   step for if said result is nonzero, removing from said input keyword string any words in

   said input keyword string that are prefixes of words in the element;

   step for if said input keyword string is empty, adding said element to a list of matched

   items; and

   step for restoring said input keyword string; and

  step for rendering said list of matched items.

89. A program storage device readable by a machine, embodying a program of instructions

   executable by the machine to perform a method for creating a keyword string database, the

   method comprising:

   determining one or more candidate keyword strings to store in said database;

   creating one or more bit vectors based at least in part on said one or more candidate keyword

      strings, said one or more bit vectors for use in comparing an input bit vector with said

      one or more bit vectors to indicate whether an input keyword string represented by said

      input bit vector matches said one or more candidate keyword strings; and

   storing said one or more bit vectors and a reference to said one or more candidate keyword

      strings in said database.

90. The program storage device of claim 89 wherein said bit vector further comprises at least one

   bit that represents a non-alphanumeric symbol.

91. The program storage device of claim 90 wherein said non-alphanumeric symbol indicates an

   email address.

92. The program storage device of claim 90 wherein said non-alphanumeric symbol indicates a

   mobile number.

93. The program storage device of claim 90 wherein said non-alphanumeric symbol indicates a

   wired number.

94. The program storage device of claim 90 wherein said non-alphanumeric symbol indicates a paper-mail address.

95. The program storage device of claim 90 wherein said non-alphanumeric symbol indicates a cost ranking.

96. The program storage device of claim 90 wherein said non-alphanumeric symbol indicates a quality ranking.

97. The program storage device of claim 90 wherein said non-alphanumeric symbol indicates a cuisine.

98. A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for incremental keyword search, the method comprising:

    submitting an input keyword string comprising one or more words comprising one or more symbols; and

    receiving in response to said submitting at least one candidate keyword string having a bit vector that matches a bit vector of said input keyword string.

99. The program storage device of claim 98 wherein said method further comprises preempting said method after a predetermined amount of time.

100. The program storage device of claim 99 wherein said predetermined amount of time is two

seconds.

101. A program storage device readable by a machine, embodying a program of instructions

executable by the machine to perform a method for incremental keyword search, the method

comprising:

receiving an input keyword string comprising one or more words comprising one or more

symbols;

creating a bit vector based at least in part on said input keyword string;

comparing said bit vector with one or more other bit vectors representing at least one

candidate keyword string to create a set of matching bit vectors;

applying a conventional keyword matching algorithm to said at least one candidate keyword

string represented by said set of matching bit vectors; and

presenting any matching candidate keyword strings.

102. The program storage device of claim 101 wherein said method further comprises preempting

said method after a predetermined amount of time.

103. The program storage device of claim 102 wherein said predetermined amount of time is two

seconds.

104. The program storage device of claim 101 wherein said comparing is independent of the order

of keyword prefixes in keyword strings.

105. A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for creating a keyword string database, the method comprising:

determining one or more candidate keyword strings to store in said database;

creating one or more bit vectors based at least in part on said one or more candidate keyword strings, said bit vector having a bit position for each symbol in an alphabet and having bits set for bit positions corresponding to at least one symbol representing the first symbol of a word in said one or more candidate keyword strings, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

106. A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for incremental keyword search, the method comprising:

submitting an input keyword string comprising one or more words comprising one or more symbols; and

receiving in response to said submitting at least one candidate keyword string where the first symbol of at least one word in each of said at least one candidate keyword string matches the first symbol of the corresponding word in said input keyword string.

107. The program storage device of claim 106 wherein said method further comprises preempting said method after a predetermined amount of time.

108. The program storage device of claim 107 wherein said predetermined amount of time is two seconds.

109. A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for incremental keyword search, the method comprising:

receiving an input keyword string comprising one or more words comprising one or more symbols;

creating a bit vector based at least in part on said input keyword string, said bit vector having a bit position for each symbol in an alphabet and having bits set for positions corresponding to at least one symbol representing the first symbol of a word in said input keyword string;

comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors;

applying a conventional keyword matching algorithm to said at least one candidate keyword string represented by said set of matching bit vectors; and

presenting any matching candidate keyword strings.

110. The program storage device of claim 109 wherein said method further comprises preempting said method after a predetermined amount of time.

111. The program storage device of claim 110 wherein said predetermined amount of time is two seconds.

112. The program storage device of claim 109 wherein said comparing is independent of the order of keyword prefixes in keyword strings.

113. A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for comparing keyword strings, the method comprising:

determining a relative frequency of use for at least one symbol in a language;

assigning a statistical weighting to said at least one symbol based at least in part on a relative frequency of use of said at least one symbol;

assigning each of said at least one symbol to one of a plurality of groups; and

comparing a first keyword string and a second keyword string based at least in part on whether at least one symbol of said first keyword string is assigned to the same group as at least one corresponding symbol of said second keyword string.

114. The program storage device of claim 113 wherein said assigning further comprises assigning each of said at least one symbol to one of a plurality of groups so as to minimize the difference between the sums of statistical weightings for symbols comprising each group in said plurality of groups.

115. The program storage device of claim 113 wherein said relative frequency of use comprises the relative frequency of use of symbols in the first character of words in said language.

116. A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for creating a keyword string database, the method comprising:

determining one or more candidate keyword strings to store in said database;

creating one or more bit vectors based at least in part on said one or more candidate keyword strings, each bit of said one or more bit vectors corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to the first symbol of a word in said one or more candidate keyword strings being set, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

117. A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for incremental keyword search, the method comprising:

submitting an input keyword string comprising one or more words comprising one or more symbols, each symbol representing the first symbol of a word in a search string; and

receiving in response to said submitting at least one candidate keyword string where the first

symbol of each word in each candidate keyword string is comprised by a group

comprising said one or more symbols.

118. The program storage device of claim 117 wherein said method further comprises preempting

said method after a predetermined amount of time.

119. The program storage device of claim 118 wherein said predetermined amount of time is two

seconds.

120. A program storage device readable by a machine, embodying a program of instructions

executable by the machine to perform a method for incremental keyword search, the method

comprising:

receiving an input keyword string comprising one or more words comprising one or more

symbols, each symbol representing the first symbol of a word in a search string;

creating a bit vector based at least in part on said input keyword string, each bit

corresponding to one or more symbols in an alphabet, bits having a bit position

corresponding to said one or more symbols being set;

comparing said bit vector with one or more other bit vectors representing at least one

candidate keyword string to create a set of matching bit vectors;

applying a conventional keyword matching algorithm to said at least one candidate keyword

string represented by said set of matching bit vectors; and

presenting any matching candidate keyword strings.

121. The program storage device of claim 120 wherein said method further comprises preempting said method after a predetermined amount of time.

122. The program storage device of claim 121 wherein said predetermined amount of time is two seconds.

123. The program storage device of claim 120 wherein said comparing is independent of the order of keyword prefixes in keyword strings.

124. A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for creating a keyword string database, the method comprising:

determining one or more candidate keyword strings to store in said database;

creating one or more bit vectors based at least in part on said one or more candidate keyword strings, each bit of said one or bit vector corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to a symbol of a prefix of a word in said one or more candidate keyword strings being set, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

125. A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for incremental keyword search, the method comprising:

submitting an input keyword string comprising one or more words comprising one or more symbols; and

receiving in response to said submitting at least one candidate keyword string where a prefix of a word of a matching candidate keyword string comprises at least one symbol that belongs to the same symbol group as the corresponding symbol of the corresponding word in said input keyword string.

126. The program storage device of claim 125 wherein said method further comprises preempting said method after a predetermined amount of time.

127. The program storage device of claim 126 wherein said predetermined amount of time is two seconds.

128. A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for incremental keyword search, the method comprising:

receiving an input keyword string comprising one or more words comprising one or more symbols;

creating a bit vector based at least in part on said input keyword string, each bit corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to a prefix of a word in said one or more symbols being set;

comparing said bit vector with one or more other bit vectors representing at least one

candidate keyword string to create a set of matching bit vectors;

applying a conventional keyword matching algorithm to said at least one candidate keyword

string represented by said set of matching bit vectors; and

presenting any matching candidate keyword strings.

129. The program storage device of claim 128 wherein said method further comprises preempting

said method after a predetermined amount of time.

130. The program storage device of claim 129 wherein said predetermined amount of time is two

seconds.

131. The program storage device of claim 128 wherein said comparing is independent of the order

of keyword prefixes in keyword strings.

132. A program storage device readable by a machine, embodying a program of instructions

executable by the machine to perform a method for incremental keyword search, the method

comprising:

receiving an input keyword string comprising one or more words comprising one or more

symbols, each symbol representing the first symbol of a word in a search string;

receiving a hierarchy, elements of said hierarchy comprising intermediate nodes and leaf

nodes representing one or more keyword strings comprising one or more words

comprising one or more symbols;

creating hierarchy bit vectors corresponding to said one or more keyword strings in said

hierarchy;

searching said hierarchy bit vectors for a match with said input keyword string, said

searching comprising, for each of said elements of said hierarchy:

saving said input keyword string;

applying a logical "AND" operation to the bit vector of the element and a bit vector based

at least in part on said input keyword string, said applying producing a result;

if said result is nonzero, removing from said input keyword string any words in said input

keyword string that are prefixes of words in the element;

if said input keyword string is empty, adding said element to a list of matched items; and

restoring said input keyword string; and

rendering said list of matched items.

133. An apparatus for creating a keyword string database, the apparatus comprising:

means for determining one or more candidate keyword strings to store in said database;

means for creating one or more bit vectors based at least in part on said one or more

candidate keyword strings, said one or more bit vectors for use in comparing an input bit

vector with said one or more bit vectors to indicate whether an input keyword string

represented by said input bit vector matches said one or more candidate keyword strings;

and

means for storing said one or more bit vectors and a reference to said one or more candidate

keyword strings in said database.

134. The apparatus of claim 133 wherein said bit vector further comprises at least one bit that represents a non-alphanumeric symbol.

135. The apparatus of claim 134 wherein said non-alphanumeric symbol indicates an email address.

136. The apparatus of claim 134 wherein said non-alphanumeric symbol indicates a mobile number.

137. The apparatus of claim 134 wherein said non-alphanumeric symbol indicates a wired number.

138. The apparatus of claim 134 wherein said non-alphanumeric symbol indicates a paper-mail address.

139. The apparatus of claim 134 wherein said non-alphanumeric symbol indicates a cost ranking.

140. The apparatus of claim 134 wherein said non-alphanumeric symbol indicates a quality ranking.

141. The apparatus of claim 134 wherein said non-alphanumeric symbol indicates a cuisine.

142. An apparatus for incremental keyword search, the apparatus comprising:

   means for receiving an input keyword string comprising one or more words comprising one or more symbols;

   means for creating a bit vector based at least in part on said input keyword string;

   means for comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors;

   means for applying a conventional keyword matching algorithm to said at least one candidate keyword string represented by said set of matching bit vectors; and

   means for presenting any matching candidate keyword strings.

143. The apparatus of claim 142, further comprising means for preempting said receiving, said creating, said comparing, said applying and said presenting after a predetermined amount of time.

144. The apparatus of claim 143 wherein said predetermined amount of time is two seconds.

145. The apparatus of claim 142 wherein said comparing is independent of the order of keyword prefixes in keyword strings.

146. An apparatus for creating a keyword string database, the apparatus comprising:

   means for determining one or more candidate keyword strings to store in said database;

   means for creating one or more bit vectors based at least in part on said one or more candidate keyword strings, said bit vector having a bit position for each symbol in an alphabet and having bits set for bit positions corresponding to at least one symbol

representing the first symbol of a word in said one or more candidate keyword strings, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

means for storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

147. An apparatus for incremental keyword search, the apparatus comprising:

means for receiving an input keyword string comprising one or more words comprising one or more symbols;

means for creating a bit vector based at least in part on said input keyword string, said bit vector having a bit position for each symbol in an alphabet and having bits set for positions corresponding to at least one symbol representing the first symbol of a word in said input keyword string;

means for comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors;

means for applying a conventional keyword matching algorithm to said at least one candidate keyword string represented by said set of matching bit vectors; and

means for presenting any matching candidate keyword strings.

148. The apparatus of claim 147, further comprising means for preempting said receiving, said creating, said comparing, said applying and said presenting after a predetermined amount of time.

149. The apparatus of claim 148 wherein said predetermined amount of time is two seconds.

150. The apparatus of claim 147 wherein said comparing is independent of the order of keyword prefixes in keyword strings.

151. An apparatus for comparing keyword strings, the apparatus comprising:

means for determining a relative frequency of use for at least one symbol in a language;

means for assigning a statistical weighting to said at least one symbol based at least in part on a relative frequency of use of said at least one symbol;

means for assigning each of said at least one symbol to one of a plurality of groups; and

means for comparing a first keyword string and a second keyword string based at least in part on whether at least one symbol of said first keyword string is assigned to the same group as at least one corresponding symbol of said second keyword string.

152. The apparatus of claim 151 wherein said means for assigning further comprises means for assigning each of said at least one symbol to one of a plurality of groups so as to minimize the difference between the sums of statistical weightings for symbols comprising each group in said plurality of groups.

153. The apparatus of claim 151 wherein said relative frequency of use comprises the relative frequency of use of symbols in the first character of words in said language.

154. An apparatus for creating a keyword string database, the apparatus comprising:

means for determining one or more candidate keyword strings to store in said database;

means for creating one or more bit vectors based at least in part on said one or more candidate keyword strings, each bit of said one or more bit vectors corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to the first symbol of a word in said one or more candidate keyword strings being set, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

means for storing said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

155. An apparatus for incremental keyword search, the apparatus comprising:

means for receiving an input keyword string comprising one or more words comprising one or more symbols, each symbol representing the first symbol of a word in a search string;

means for creating a bit vector based at least in part on said input keyword string, each bit corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to said one or more symbols being set;

means for comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors;

means for applying a conventional keyword matching algorithm to said at least one candidate

keyword string represented by said set of matching bit vectors; and

means for presenting any matching candidate keyword strings.

156. The apparatus of claim 155, further comprising means for preempting said receiving, said

creating, said comparing, said applying and said presenting after a predetermined amount of

time.

157. The apparatus of claim 156 wherein said predetermined amount of time is two seconds.

158. The apparatus of claim 155 wherein said comparing is independent of the order of keyword

prefixes in keyword strings.

159. An apparatus for creating a keyword string database, the apparatus comprising:

means for determining one or more candidate keyword strings to store in said database;

means for creating one or more bit vectors based at least in part on said one or more

candidate keyword strings, each bit of said one or bit vector corresponding to one or

more symbols in an alphabet, bits having a bit position corresponding to a symbol of a

prefix of a word in said one or more candidate keyword strings being set, said one or

more bit vectors for use in comparing an input bit vector with said one or more bit

vectors to indicate whether an input keyword string represented by said input bit vector

matches said one or more candidate keyword strings; and

means for storing said one or more bit vectors and a reference to said one or more candidate

keyword strings in said database.

160. An apparatus for incremental keyword search, the apparatus comprising:

  means for receiving an input keyword string comprising one or more words comprising one or more symbols;

  means for creating a bit vector based at least in part on said input keyword string, each bit corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to a prefix of a word in said one or more symbols being set;

  means for comparing said bit vector with one or more other bit vectors representing at least one candidate keyword string to create a set of matching bit vectors;

  means for applying a conventional keyword matching algorithm to said at least one candidate keyword string represented by said set of matching bit vectors; and

  means for presenting any matching candidate keyword strings.

161. The apparatus of claim 160, further comprising means for preempting said said receiving, said creating, said comparing, said applying and said presenting after a predetermined amount of time.

162. The apparatus of claim 161 wherein said predetermined amount of time is two seconds.

163. The apparatus of claim 160 wherein said comparing is independent of the order of keyword prefixes in keyword strings.

164. An apparatus for incremental keyword search, the apparatus comprising:

  means for receiving an input keyword string comprising one or more words comprising one or more symbols, each symbol representing the first symbol of a word in a search string;

means for receiving a hierarchy, elements of said hierarchy comprising intermediate nodes

and leaf nodes representing one or more keyword strings comprising one or more words

comprising one or more symbols;

means for creating hierarchy bit vectors corresponding to said one or more keyword strings

in said hierarchy;

means for searching said hierarchy bit vectors for a match with said input keyword string,

said means for searching comprising, for each of said elements of said hierarchy:

means for saving said input keyword string;

means for applying a logical "AND" operation to the bit vector of the element and a bit

vector based at least in part on said input keyword string, said applying producing a

result;

means for if said result is nonzero, removing from said input keyword string any words in

said input keyword string that are prefixes of words in the element;

means for if said input keyword string is empty, adding said element to a list of matched

items; and

means for restoring said input keyword string; and

means for rendering said list of matched items.

165. An apparatus for creating a keyword string database, the apparatus comprising:

a memory for storing said keyword string database; and

a processor configured to:

determine one or more candidate keyword strings to store in said database;

create one or more bit vectors based at least in part on said one or more candidate

keyword strings, said one or more bit vectors for use in comparing an input bit vector

with said one or more bit vectors to indicate whether an input keyword string

represented by said input bit vector matches said one or more candidate keyword

strings; and

store said one or more bit vectors and a reference to said one or more candidate keyword

strings in said database.

166. The apparatus of claim 165 wherein said bit vector further comprises at least one bit that

represents a non-alphanumeric symbol.

167. The apparatus of claim 166 wherein said non-alphanumeric symbol indicates an email

address.

168. The apparatus of claim 166 wherein said non-alphanumeric symbol indicates a mobile

number.

169. The apparatus of claim 166 wherein said non-alphanumeric symbol indicates a wired

number.

170. The apparatus of claim 166 wherein said non-alphanumeric symbol indicates a paper-mail

address.

171. The apparatus of claim 166 wherein said non-alphanumeric symbol indicates a cost ranking.

172. The apparatus of claim 166 wherein said non-alphanumeric symbol indicates a quality

ranking.

173. The apparatus of claim 166 wherein said non-alphanumeric symbol indicates a cuisine.

174. An apparatus for incremental keyword search, the apparatus comprising:

a user interface configured to receive an input keyword string comprising one or more words

comprising one or more symbols, said user interface further configured to present any

matching keyword strings; and

a search engine in communication with said user interface and configured to:

create a bit vector based at least in part on said input keyword string;

compare said bit vector with one or more other bit vectors representing at least one

candidate keyword string to create a set of matching bit vectors; and

apply a conventional keyword matching algorithm to said at least one candidate keyword

string represented by said set of matching bit vectors.

175. The apparatus of claim 174 wherein said apparatus is further configured to preempt said

search enging after a predetermined amount of time.

176. The apparatus of claim 175 wherein said predetermined amount of time is two seconds.

177. The apparatus of claim 174 wherein said apparatus is further configured to compare said bit vector independent of the order of keyword prefixes in keyword strings.

178. An apparatus for creating a keyword string database, the apparatus comprising:

a memory for storing said keyword string database; and

a processor configured to:

determine one or more candidate keyword strings to store in said database;

create one or more bit vectors based at least in part on said one or more candidate keyword strings, said bit vector having a bit position for each symbol in an alphabet and having bits set for bit positions corresponding to at least one symbol representing the first symbol of a word in said one or more candidate keyword strings, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

store said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

179. An apparatus for incremental keyword search, the apparatus comprising:

a user interface configured to receive an input keyword string comprising one or more words comprising one or more symbols, said user interface further configured to present any matching keyword strings; and

a search engine in communication with said user interface and configured to:

create a bit vector based at least in part on said input keyword string, said bit vector

having a bit position for each symbol in an alphabet and having bits set for positions

corresponding to at least one symbol representing the first symbol of a word in said

input keyword string;

compare said bit vector with one or more other bit vectors representing at least one

candidate keyword string to create a set of matching bit vectors; and

apply a conventional keyword matching algorithm to said at least one candidate keyword

string represented by said set of matching bit vectors.

180. The apparatus of claim 179 wherein said apparatus is further configured to preempt said

search enging after a predetermined amount of time.

181. The apparatus of claim 180 wherein said predetermined amount of time is two seconds.

182. The apparatus of claim 179 wherein said apparatus is further configured to compare said bit

vector independent of the order of keyword prefixes in keyword strings.

183. An apparatus for comparing keyword strings, the apparatus comprising:

a memory for storing at least one relative frequency of use for at least one symbol in a

language; and

a processor configured to:

determine a relative frequency of use for at least one symbol in a language;

assign a statistical weighting to said at least one symbol based at least in part on a relative

frequency of use of said at least one symbol;

assign each of said at least one symbol to one of a plurality of groups; and

compare a first keyword string and a second keyword string based at least in part on

whether at least one symbol of said first keyword string is assigned to the same

group as at least one corresponding symbol of said second keyword string.

184. The apparatus of claim 183 wherein said processor is further configured to assign each of

said at least one symbol to one of a plurality of groups so as to minimize the difference

between the sums of statistical weightings for symbols comprising each group in said

plurality of groups.

185. The apparatus of claim 183 wherein said relative frequency of use comprises the relative

frequency of use of symbols in the first character of words in said language.

186. An apparatus for creating a keyword string database, the apparatus comprising:

a memory for storing said keyword string database; and

a processor configured to:

determine one or more candidate keyword strings to store in said database;

create one or more bit vectors based at least in part on said one or more candidate

keyword strings, each bit of said one or more bit vectors corresponding to one or

more symbols in an alphabet, bits having a bit position corresponding to the first

symbol of a word in said one or more candidate keyword strings being set, said one

or more bit vectors for use in comparing an input bit vector with said one or more bit

vectors to indicate whether an input keyword string represented by said input bit

vector matches said one or more candidate keyword strings; and

store said one or more bit vectors and a reference to said one or more candidate keyword

strings in said database.

187. An apparatus for incremental keyword search, the apparatus comprising:

a user interface configured to receive an input keyword string comprising one or more words

comprising one or more symbols, each symbol representing the first symbol of a word in

a search string, said user interface further configured to present any matching keyword

strings; and

a search engine in communication with said user interface and configured to:

create a bit vector based at least in part on said input keyword string, each bit

corresponding to one or more symbols in an alphabet, bits having a bit position

corresponding to said one or more symbols being set;

compare said bit vector with one or more other bit vectors representing at least one

candidate keyword string to create a set of matching bit vectors; and

apply a conventional keyword matching algorithm to said at least one candidate keyword

string represented by said set of matching bit vectors.

188. The apparatus of claim 187 wherein said apparatus is further configured to preempt said

search enging after a predetermined amount of time.

189. The apparatus of claim 188 wherein said predetermined amount of time is two seconds.

190. The apparatus of claim 187 wherein said apparatus is further configured to compare said bit vector independent of the order of keyword prefixes in keyword strings.

191. An apparatus for creating a keyword string database, the apparatus comprising:

a memory for storing said keyword string database; and

a processor configured to:

determine one or more candidate keyword strings to store in said database;

create one or more bit vectors based at least in part on said one or more candidate keyword strings, each bit of said one or bit vector corresponding to one or more symbols in an alphabet, bits having a bit position corresponding to a symbol of a prefix of a word in said one or more candidate keyword strings being set, said one or more bit vectors for use in comparing an input bit vector with said one or more bit vectors to indicate whether an input keyword string represented by said input bit vector matches said one or more candidate keyword strings; and

store said one or more bit vectors and a reference to said one or more candidate keyword strings in said database.

192. An apparatus for incremental keyword search, the apparatus comprising:

a user interface configured to receive an input keyword string comprising one or more words comprising one or more symbols, said user interface further configured to present any matching keyword strings; and

a search engine in communication with said user interface and configured to:

create a bit vector based at least in part on said input keyword string, each bit

corresponding to one or more symbols in an alphabet, bits having a bit position

corresponding to a prefix of a word in said one or more symbols being set;

compare said bit vector with one or more other bit vectors representing at least one

candidate keyword string to create a set of matching bit vectors; and

apply a conventional keyword matching algorithm to said at least one candidate keyword

string represented by said set of matching bit vectors.

193. The apparatus of claim 192 wherein said apparatus is further configured to preempt said

search enging after a predetermined amount of time.

194. The apparatus of claim 193 wherein said predetermined amount of time is two seconds.

195. The apparatus of claim 192 wherein said apparatus is further configured to compare said bit

vector independent of the order of keyword prefixes in keyword strings.

196. An apparatus for incremental keyword search, the apparatus comprising:

a user interface configured to receive an input keyword string comprising one or more words

comprising one or more symbols, said user interface further configured to present any

matching keyword strings; and

a search engine in communication with said user interface and configured to:

receive an input keyword string comprising one or more words comprising one or more

symbols, each symbol representing the first symbol of a word in a search string;

receive a hierarchy, elements of said hierarchy comprising intermediate nodes and leaf

nodes representing one or more keyword strings comprising one or more words

comprising one or more symbols;

create hierarchy bit vectors corresponding to said one or more keyword strings in said

hierarchy;

search said hierarchy bit vectors for a match with said input keyword string, said

apparatus further configured to, for each of said elements of said hierarchy:

save said input keyword string;

apply a logical "AND" operation to the bit vector of the element and a bit vector

based at least in part on said input keyword string, said applying producing a

result;

if said result is nonzero, remove from said input keyword string any words in said

input keyword string that are prefixes of words in the element;

if said input keyword string is empty, add said element to a list of matched items; and

restoring said input keyword string; and

render said list of matched items; and

apply a conventional keyword matching algorithm to said at least one keyword string

represented by one or more element in said list of matched items.

197. A method for comparing keyword strings, the method comprising:

assigning each of at least one symbol in a language to one of a plurality of groups; and

comparing a first keyword string and a second keyword string based at least in part on

whether at least one symbol of said first keyword string is assigned to the same group as

at least one corresponding symbol of said second keyword string.

198. The method of claim 197 wherein said plurality of groups corresponds with a telephone keyboard symbol grouping.

199. A method for comparing keyword strings, the method comprising:

step for assigning each of at least one symbol in a language to one of a plurality of groups; and

step for comparing a first keyword string and a second keyword string based at least in part on whether at least one symbol of said first keyword string is assigned to the same group as at least one corresponding symbol of said second keyword string.

200. The method of claim 199 wherein said plurality of groups corresponds with a telephone keyboard symbol grouping.

201. A program storage device readable by a machine, embodying a program of instructions executable by the machine to perform a method for comparing keyword strings, the method comprising:

assigning each of at least one symbol in a language to one of a plurality of groups; and

comparing a first keyword string and a second keyword string based at least in part on whether at least one symbol of said first keyword string is assigned to the same group as at least one corresponding symbol of said second keyword string.

202. The program storage device of claim 201 wherein said plurality of groups corresponds with a telephone keyboard symbol grouping.

203. An apparatus for comparing keyword strings, the method comprising:

means for assigning each of at least one symbol in a language to one of a plurality of groups; and

means for comparing a first keyword string and a second keyword string based at least in part on whether at least one symbol of said first keyword string is assigned to the same group as at least one corresponding symbol of said second keyword string.

204. The apparatus of claim 203 wherein said plurality of groups corresponds with a telephone keyboard symbol grouping.

205. An apparatus for comparing keyword strings, the apparatus comprising:

a memory for storing said keyword strings; and

a processor configured to:

assign each of at least one symbol in a language to one of a plurality of groups; and

compare a first keyword string and a second keyword string based at least in part on whether at least one symbol of said first keyword string is assigned to the same group as at least one corresponding symbol of said second keyword string.

206. The apparatus of claim 205 wherein said plurality of groups corresponds with a telephone

keyboard symbol grouping.